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EXAMINER	
MAZUMDAR, SONYA	
ART UNIT	PAPER NUMBER
1791	
MAIL DATE	DELIVERY MODE
03/17/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/539,886	EUN ET AL.	
	Examiner	Art Unit	
	SONYA MAZUMDAR	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 December 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8 and 10-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8 and 10-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

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DETAILED ACTION

Response to Amendment

1. Cancellation of claim 9 has been acknowledged.

Response to Arguments

2. Applicant's amendment, see page 2 in remarks filed December 13, 2007, with respect to specification, have been fully considered, and the objection has been withdrawn.

3. Applicant's amendments and arguments, see page 3 in the remarks, with respect to the pending have been fully considered, but are moot in view of the new ground of rejection.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1, 2, 3, 11, 12, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. (US 2002/0048076) in view of Lee et al. (US 2001/0035123)

With respect to claim 1, 12, and 13, Kondo et al. teach preparing a traveling wave-type optical modulator by adhering a ferroelectric single crystal plate (1A – Fig. 1b, 4 – Fig. 1c) to a substrate (1B) with an epoxy-based resin film (3) (paragraphs 0021, 0022, 0056, 0064, and 0076; Figure 1b and 1c).

Kondo et al. do not teach preparing the modulator with the single crystal plate having a composition as claimed. However, it would have been obvious to do so, as Lee et al. teach making a single crystal with a high dielectric constant together with good electromechanical and electrooptical properties, useful for optical modulators with the same composition as set forth in the claim (Lee: paragraphs 0002; 0009-00017).

With respect to claim 3, although heating to bond a laminate of a ferroelectric single crystal and a substrate at room temperature is not specifically taught, it is inherent that one would do so using a resin curable at room temperature (paragraph

0022). However, if it is not inherent, it would have been obvious for Kondo et al. to do so to cure the resin without overheating the entire laminate.

With respect to claim 11, Kondo et al. teach sputtering a conductive layer on a surface of a ferroelectric single crystal plate opposite to where and adhesive layer is disposed (paragraph 0060).

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. in view of Lee et al., as applied to claim 3 above, and further in view of Yachi et al. (US 5,925,968) and Durand et al. (US 5,183,593)

The teachings of claim 1 are as described above.

Kondo et al. in view of Lee et al. do not teach using a conductive adhesive comprising gold, silver, or platinum. However, Durand et al. teach using an electrically conductive bonding cement, comprising gold or silver, to mate electrically conductive surfaces (Durand: abstract, column 1, lines 31-33); Yachi et al. teach bonding piezoelectric or ferroelectric element to a substrate with an electrically conductive paste, such as silver paste (Yachi: column 7, lines 25-29; column 10, lines 44-48; column 11, lines 62-64).

It would have been obvious to one having ordinary skill in the art to use a conductive adhesive, such as a gold or silver paste, as opposed to other adhesives and one would have been motivated to do so to form a strong and reliable bond between electrical components to provide an electron pathway (Durand: column 1, lines 39-45).

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. in view of Lee et al., as applied to claim 3 above, and further in view of Fujioka et al. (DE 4037271).

The teachings of claim 3 are as described above.

Kondo et al. in view of Lee et al. do not specifically teach how adhesive is applied to a substrate. However, Fujioka et al. teach applying adhesive with a piston (1) that has plates (3, 4) equipped with a cylinder (11) having a compressive part at the forward end of the piston shaft (Fujioka: abstract; Figures 1-3).

It would have been obvious to use an application means as Fujioka et al. taught, and one would have been motivated to do so to have a simple and handheld application process and dispense adhesive linearly as the piston is moved (Fujioka: abstract).

10. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. in view of Lee et al., as applied to claim 1 above, and further in view of Yachi et al. and Durand et al.

The teachings of claim 1 are as described above.

Kondo et al. teach applying an adhesive layer (3) to both a ferroelectric single crystal plate (1A) and a substrate (1B) and bonding the laminate at under 600°C (column 2, lines 21-26; Figure 1b). Kondo et al. also teach forming a titanium layer (2) onto the ferroelectric single crystal plate (paragraph 0057; Figures 1a-1c).

Kondo et al. in view of Lee et al. do not expressly teach applying a conductive metal to both surfaces and bonding the two. However, Durand et al. teach using an electrically conductive bonding cement, comprising gold or silver, to mate electrically conductive surfaces (Durand: abstract, column 1, lines 31-33); Yachi et al. teach bonding piezoelectric or ferroelectric element to a substrate with an electrically conductive paste, such as silver paste (Yachi: column 7, lines 25-29; column 10, lines 44-48; column 11, lines 62-64).

It would have been obvious to one having ordinary skill in the art to use a conductive adhesive, such as a gold or silver paste, as opposed to other adhesives and one would have been motivated to do so to form a strong and reliable bond between electrical components to provide an electron pathway (Durand: column 1, lines 39-45).

11. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. in view of Lee et al., Yachi et al., and Durand et al., as applied to claim 6 above, and further in view of Suenaga et al. (US 3,715,802)

The teachings of claim 6 are as described above.

Kondo et al. in view of Lee et al., Yachi et al., and Durand et al. do not teach inserting an intermediate metal layer between two conductive metal layers prior to bonding the layers. However, Suenaga et al. teach disposing tin solder between an electrode (379) and a diode element (377) (Suenaga: column 12, line 66 – column 13, line 3).

It would have been obvious to use a tin solder to bond two conductive layers, and would have been motivated to do so because the tin solder has a relatively low melting point, and thus the laminate does not to be heated at a high temperature to bond two layers together (Suenaga: column 13, line 3 and lines 30-35).

The specification discloses that tin (Sn) or a tin-alloy may be used as an intermediate metal layer (Applicant's specification: page 7, lines 18-22).

12. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. in view of Lee et al., as applied to claim 1 above, and further in view of Yasumoto et al. (US 4,772,985)

The teachings of claim 1 are as described above.

Kondo et al. in view of Lee et al. do not specifically teach the dielectric constant of a ferroelectric film. However, Yasumoto et al. teach using ferroelectric crystal layer having a dielectric constant of 20,000 (Yasumoto: column 1, lines 23-24).

It would have been obvious for one to use a ferroelectric layer with such a dielectric constant in order to avoid signs of poor moisture resistance and poor migration resistance of electrode metals (Yasumoto: column 1, lines 32-36; column 5, lines 38-44).

13. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. in view of Lee et al., as applied to claim 1 above, and further in view of Kijima et al. (JP 09-186376)

The teachings of claim 1 are as described above.

Kondo et al. in view of Lee et al. do not specifically teach providing a substrate comprising a layer of an oxide material to be contacted with an adhesive layer. However, Kijima et al. teach providing a layer of silicon dioxide (SiO_2) (2) on the surface of a silicon substrate (1), where the silicon dioxide layer comes into contact with an adhesive layer (3) (Kijima: abstract; Drawing 1).

It would have been obvious to provide a silicon dioxide layer, as Kijima et al. taught, and one would have been motivated to do so to have an insulator layer to protect the silicon substrate (Kijima: paragraph 0010).

Conclusion

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SONYA MAZUMDAR whose telephone number is (571)272-6019. The examiner can normally be reached on 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Philip Tucker can be reached on (571) 272-1095. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SM

/Philip C Tucker/
Supervisory Patent Examiner, Art Unit 1791